

Eastern Nebraska Public Power District Consortium

Smart Grid Initiative

Abstract

The Eastern Nebraska Public Power District Consortium's (Consortium) Smart Grid Initiative includes wireless communications, supervisory control and data acquisition software (SCADA), distribution automation software, intelligent reclosers and controls, automated regulator controls, and irrigation load control devices. The project implements two-way communications, SCADA, and distribution automation applications to allow the Consortium to (1) automate substations, (2) integrate new distribution automation equipment, (3) provide increased system visibility for customer outages, and (4) reduce operations and maintenance costs. Existing irrigation load control devices for the Cuming County Public Power District (CCPPD) are being upgraded, enhancing demand response and peak load reduction capabilities.

Smart Grid Features

Communications infrastructure includes a unified, redundant wireless network for the Consortium service territory. The Consortium is evaluating various wireless technologies, including radio frequency, WiMax, and microwave, and is selecting one system for full-scale deployment. The wireless network provides the backbone for integration of substation and distribution automation equipment, smart meters, customer systems, and direct load control devices. This scalable infrastructure provides opportunities to add future service offerings and further optimize electricity delivery, system reliability, and customer participation. Distributed automation and SCADA are being deployed throughout the Consortium's service territory. This system integrates distribution devices and distribution automation applications in a centralized control platform and provides grid operators with expanded visibility and management capabilities. The Consortium expects SCADA deployment to improve system reliability, reduce outage duration, improve feeder monitoring, and assist with integration of future distribution automation equipment. The platform is being designed with each district's station as a hot backup to the other.

Distribution automation systems replace mechanical breakers on all substation feeders and select locations past the substations to provide advanced protection, control, measurement, and supervision of each feeder. The automated reclosers have modular three-phases-in-one design and can perform as a recloser, sectionalizer, or automated load break switch. The smart relays integrate the reclosers with SCADA through standard distributed network protocol communication and have advanced functionalities, such as peer-to-peer messaging and automatic loop restoration.

At-A-Glance

Recipient: Eastern Nebraska Public Power District Consortium
State: Nebraska
NERC Region: Midwest Reliability Organization
Total Budget: \$3,749,988
Federal Share: \$1,874,994
Key Partners: Cuming County Public Power District, Stanton County Public Power District

Project Type: Electric Distribution Systems

Equipment

- **Distribution Automation Equipment for 67 Out of 68 Circuits**
 - Distribution Automation Communications Network
 - SCADA Communications Network
 - Automated Distribution Circuit Switches
 - Automated Voltage Regulators
- **Direct Load Control Devices**

Key Targeted Benefits

- **Improved Electric Service Reliability and Power Quality**
- **Reduced Costs from Equipment Failures, and Distribution Line Losses**
- **Reduced Service Costs for Customers**
- **Reduced Operating and Maintenance Costs**

Eastern Nebraska Public Power District Consortium *(continued)*

Direct load control devices include devices for up to 313 agricultural customers in the CCPPD service territory. These devices replace older models of irrigation load control devices, providing a more reliable demand response capability. Participating customers receive rate incentives for contributing load reductions to the program. The Consortium expects the load control program to enable reduction of peak loads and wholesale power costs, potentially leading to lower electricity costs and deferred generation capacity expansion.

Timeline

Key Milestones	Target Dates
Regulator control upgrades complete	Q1 2011
Substation recloser installation begins	Q2 2011
Communications infrastructure installation begins	Q2 2011
SCADA/distribution automation installation begins	Q4 2011
Substation recloser installation complete	Q1 2012
Communications infrastructure installation completed	Q2 2012
SCADA/distribution automation installation complete	Q3 2012
Irrigation load control upgrades complete	Q3 2012

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